# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20170963

# Utility of fine-needle aspiration cytology as a screening tool in diagnosis of breast lumps

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**Received:** 25 February 2017 **Accepted:** 03 March 2017

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#### **ABSTRACT**

**Background:** Fine-needle aspiration cytology (FNAC) has proved to be a rapid, safe, cost effective and good screening or initial diagnostic tool for early diagnosis and management of palpable breast swellings. The present study was conducted to describe and categorize various breast lesions on FNAC. The study also aimed to find out the diagnostic accuracy of FNAC procedure.

**Methods:** This study was carried out on 175 patients who presented with palpable breast swellings in Government Hospital Gandhi Nagar, Jammu, Jammu and Kashmir, India and subsequently referred to Pathology Department of Govt. Hospital Gandhi Nagar over a period of two years and eight months from January 2013 to September 2015. Lesions were categorized as per cytomorphological features obtained on FNAC. Histopathological correlation was done on 68 cases inclusive of all malignant cases.

**Results:** 156 (89%) cases were categorized as benign and 19 cases (11%) as malignant on FNAC out of 175 cases. The most common benign lesion was fibro adenoma (41%) and the most common breast carcinoma was ductal carcinoma (65%). Sensitivity, specificity, positive predictive value, negative predictive value, LR+ and LR- came out to be 85%, 95.8%, 89%, 93.8%, 20.4 and 0.15 respectively.

**Conclusions:** FNAC is a good screening procedure for initial diagnosis of breast lumps. It is highly useful procedure in secondary care centres due to its cost effectiveness, rapid and safe nature.

**Keywords:** Breast carcinoma, Fine needle aspiration, Negative predictive value, Positive predictive value, Sensitivity, Specificity

#### INTRODUCTION

In India, breast carcinoma is the second most common malignant neoplasm next to cervical cancer in females. It is the leading cause of morbidity and mortality. Regarding breast pathology, palpable breast lump is most common presentation of patients. Fine needle aspiration cytology (FNAC), mammography and ultrasonography along with clinical examination (triple

test) have become the standard approach to the investigation of palpable breast lumps.<sup>3</sup> FNAC is rapid, simple, safe, costeffective and good screening procedure with high sensitivity, specificity and hence overall diagnostic accuracy.<sup>4,5</sup> The main purpose of FNAC in breast lumps is to pick all the suspicious breast lesions and do categorization accordingly, as in most cases definitive treatment can often be based on cytological diagnosis without the need for histopatholgical

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examination unless there is suspicion or disagreement. The present study was done to describe and categorize various breast lesions on FNAC. The study also aimed to find out the diagnostic accuracy of FNAC procedure.

#### **METHODS**

The present study was hospital based observational study where FNAC was done on 175 consecutive cases of palpable breast lumps referred to Pathology Department of Government Hospital Gandhi Nagar (secondary level hospital) of Jammu district of Jammu and Kashmir state over a period of two years and eight months from January 2013 to September 2015. In each case along with detailed history and clinical examination, variables like patient's age, gender, clinical symptoms, location of swelling, gross examination of aspirate and cytomorphological patterns were studied. After explaining the procedure in detail consent was taken from every patient. Aspiration was done using 22-gauge needle and 10ml plastic syringe with a detachable syringe holder (Franzen handle). In each case, three alcohol fixed smears were prepared, first smear was stained with papanicolaou stain, second with giemsa stain and third one was kept unstained for any further required stain. All malignant cases and some suspicious benign cases were sent for histopathology for final diagnosis. Histopathological correlation was done in 68 cases. Sensitivity, Specificity, positive predictive value, negative predictive value, positive and negative likelihood ratios had been calculated to know diagnostic accuracy. Association with age and sex was determined by Fisher Exact Test.

#### RESULTS

Fine needle aspiration was done on one hundred and seventy-five patients, Out of them 161 (92%) cases were

females and males constituted 8% of the total cases with Male to 14 female which ratio of 0.08:1 (Figure 1).

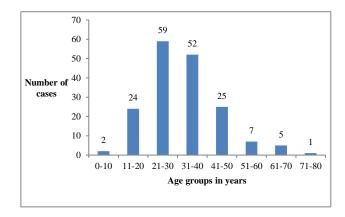


Figure 1: Age distribution of cases.

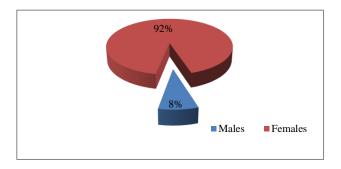


Figure 2: Sex distribution of cases

The mean age of cases was 33 years with range of 7 years to 73 years. Majority of patients were in the age group of 21-30 years (Figure 2). Left breast was more involved as compared to right breast with maximum cases in outer upper quadrant. Blood mixed aspirate was most common type of aspirate (Table 1).

|                         | Diagnosis                | Male | Female | Total | Percentage |
|-------------------------|--------------------------|------|--------|-------|------------|
|                         | Acute Mastitis           | 02   | 09     | 11    | 6.3%       |
|                         | Granulomatous mastitis   | 00   | 04     | 04    | 2.3%       |
| Inflammatory lesions    | Tubercular Mastitis      | 00   | 02     | 02    | 1.1%       |
|                         | Fat Necrosis             | 00   | 02     | 02    | 1.1%       |
| Benign breast lesions   | Benign cyst              | 00   | 02     | 02    | 1.1%       |
|                         | Epidermal inclusion cyst | 00   | 03     | 03    | 1.7%       |
|                         | Epidermal hyperplasia    | 00   | 04     | 04    | 2.3%       |
|                         | Galactocele              | 00   | 03     | 03    | 1.7%       |
|                         | Gynaecomastia            | 10   | 00     | 10    | 5.7%       |
|                         | Haemangioma              | 01   | 01     | 02    | 1.1%       |
|                         | Lipoma                   | 01   | 09     | 10    | 5.7%       |
|                         | Fibrocystic disease      | 00   | 31     | 31    | 17.7%      |
|                         | Fibroadenoma             | 00   | 72     | 72    | 41.1%      |
| Malignant breast lesion | Malignant breast lesion  | 00   | 19     | 19    | 10.9%      |
| Total                   |                          | 14   | 161    | 175   | 100%       |

Table 1: Distribution of cases according to type of breast lesion.

Table 2: Distribution of breast lesions.

|   | Number of cases (n=100) | Percentage |  |  |  |
|---|-------------------------|------------|--|--|--|
| Anatomical distribution of breast lesions |                         |            |  |  |  |
| Right                                     | 84                      | 48         |  |  |  |
| Left                                      | 85                      | 49         |  |  |  |
| Bilateral                                 | 6                       | 3          |  |  |  |
| Quadrant distribution                     |                         |            |  |  |  |
| All                                       | 7                       | 4          |  |  |  |
| Lower inner                               | 12                      | 7          |  |  |  |
| Lower outer                               | 18                      | 10         |  |  |  |
| Subareolar                                | 18                      | 10         |  |  |  |
| Upper inner                               | 21                      | 12         |  |  |  |
| Upper outer                               | 99                      | 57         |  |  |  |
| Type of aspirate                          |                         |            |  |  |  |
| Blood mixed                               | 110                     | 62.8       |  |  |  |
| Whitish                                   | 24                      | 13.7       |  |  |  |
| Purulent                                  | 15                      | 8.6        |  |  |  |
| Fatty                                     | 10                      | 5.7        |  |  |  |
| Fluid                                     | 8                       | 4.8        |  |  |  |
| Cheesy                                    | 3                       | 1.7        |  |  |  |
| Particulate                               | 2                       | 1.1        |  |  |  |
| Milk                                      | 2                       | 1.1        |  |  |  |
| Yellow                                    | 1                       | 0.5        |  |  |  |

Table 3: Association of type of breast lesion with age and sex.

| Age groups   | Benign | Malignant | Total |                                      |  |  |
|--|--------|-----------|-------|--------------------------------------|--|--|
| 0-10   | 2      | 0         | 2     |                                      |  |  |
| 11-20  | 24     | 0         | 24    |                                      |  |  |
| 21-30  | 58     | 1         | 59    |                                      |  |  |
| 31-40  | 46     | 6         | 52    | Fisher Exact                         |  |  |
| 41-50  | 17     | 8         | 25    | Test p<0.01<br>Highly<br>significant |  |  |
| 51-60  | 5      | 2         | 7     |                                      |  |  |
| 61-70  | 3      | 2         | 5     |                                      |  |  |
| 71-80  | 1      | 0         | 1     |                                      |  |  |
| Total  | 156    | 19        | 175   |                                      |  |  |
| (For purpose of analysis patients have been categorised into less than 40 years and more than 40 years.) |        |           |       |                                      |  |  |
| Sex wise   | Benign | Malignant | Total |                                      |  |  |
| Male   | 14     | 0         | 14    | Fisher                               |  |  |
| Female   | 142    | 19        | 161   | Exact Test                           |  |  |
| Total  | 156    | 19        | 175   | p=0.3Not<br>significant              |  |  |

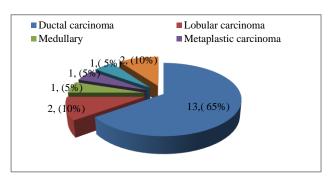


Figure 3: Distribution of malignant cases confirmed on histopathology.

On FNAC, 156 cases (89%) came out to be benign and 19 cases (11%) were malignant (Table 3). Among benign cases, maximum were fibro adenoma cases (41%) followed by fibrocystic disease in 17.7% cases. Histopathological correlation was done in 68 cases inclusive of 19 malignant cases and 49 benign cases. Ductal carcinoma was most common type observed among malignant cases (Figure 3).

Table 4: Cyto-histopathological correlation of 68 cases of breast lesion.

| Histopathological diagnosis |           |           |       |  |  |  |
|-----------------------------|-----------|-----------|-------|--|--|--|
| Cytological diagnosis       | Malignant | Benign    | Total |  |  |  |
| Malignant                   | 17 (True  | 02 (False | 19    |  |  |  |
| Manghant                    | positive) | positive) |       |  |  |  |
| Danian                      | 03 (False | 46 (True  | 49    |  |  |  |
| Benign                      | negative) | negative) |       |  |  |  |
| Total                       | 20        | 48        | 68    |  |  |  |

Benign cases were significantly more (p<0.001) in younger age (less than 40 years) whereas malignant breast lesions were found significantly more (p<0.001) in older age group (>40 years). However, the association with sex was not significant (Table 3). Sensitivity, Specificity, positive predictive value, negative predictive value, LR+ and LR- came out to be 85%, 95.8%, 89%, 93.8%, 20.4 and 0.15 respectively (Table 4).

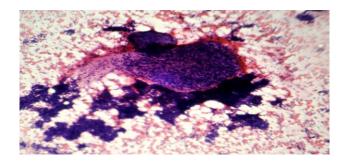


Figure 4: Microphotograph of FNA smears from Fibroadenoma depicting bimodal population clusters of ductular cells along with stromal fragment and bare bipolar nuclei (20x, PAP).



Figure 5: Microphotograph of FNA smears from acute mastitis depicting numerous polymorphs along with a ductular epithelial cell cluster showing reactive atypia (10x, PAP).

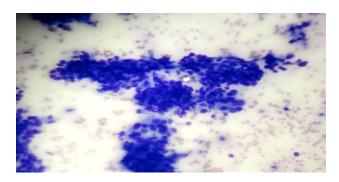


Figure 6: Microphotograph of FNA smears of carcinoma breast depicting pleomorphic tumor cells with prominent nucleoli and high N:C ratio (20x, MGG).

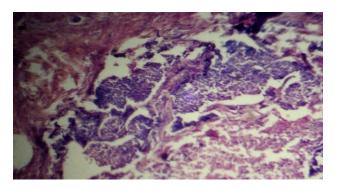


Figure 7: Microphotograph of histopathology of carcinoma breast (infiltrating ductal type) depicting tumor cells in sheets infiltrating into desmoplastic stroma (20x, H and E).

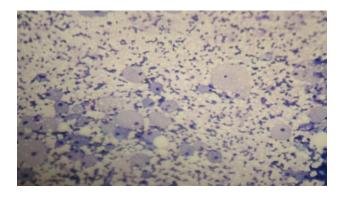


Figure 8: Microphotograph of FNA smears from galactocele depicting numerous cystic macrophages lying in a milky background (20x, MGG).

## **DISCUSSION**

Early screening and diagnosis of breast lesions help in timely prevention and management of breast pathologies. The most common age group in our study was 21-30 years. Similar observations were reported by Farkhanda and co-authors, Chandanwale et al.<sup>6,7</sup> However Haque et al reported 30-40 years as most common age group.<sup>8</sup> In present study, left breast and outer upper quadrant were more commonly involved as compared to right breast.

However, Chandanwale et al reported more common involvement of right breast.<sup>7</sup> Out of 175 cases of FNAC, 89% lesions were benign and 11% were reported as malignant. This finding corroborates with other studies in literature as well.<sup>9,10</sup> However Bdour M et al had reported much higher incidence of carcinomas (41%).<sup>11</sup> Benign lesions were significantly more associated with younger age groups as compared to malignant lesions which were more common in patients older than 40 years of age. Similar pattern of findings were observed by various authors.<sup>9,12-14</sup>

In present study, among benign lesions, fibro adenoma was most common benign lesion, followed by fibrocystic disease and ductal carcinoma was most common lesion among malignant ones. Similar observations were made by other researchers as well. 9.10,15 Few studies have reported fibrocystic disease as the common diagnosis followed by fibroadenoma. 14,16

Similar to other studies, we have also reported higher sensitivity, specificity, negative predictive value and thus very good overall diagnostic accuracy of FNAC in diagnosing breast lesions.<sup>9-11</sup>

### **CONCLUSION**

FNAC is simple, safe and cost effective outpatient procedure. High sensitivity and negative predictive value makes it a good screening procedure especially in secondary care centres where on the basis of FNAC alone we can pick large number of patients suffering from benign or malignant condition as suspicious cases can always be confirmed by Histopathology. Moreover, early diagnosis can significantly reduce morbidity and mortality.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

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**Cite this article as:** Gupta R, Dewan D, Kumar D, Sharma R. Utility of fine-needle aspiration cytology as a screening tool in diagnosis of breast lumps. Int Surg J 2017;4:1171-5.